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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,468	12/07/2000	Christopher Mark Bowles	TI-24521	3187

23494 7590 09/20/2004

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/732,468

Applicant(s)

BOWLES ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-9, 13-15, 17, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Zheng et al. (US 5,728,621).

Zheng describes a method for forming shallow trench isolation structures comprising: forming a plurality of isolation trenches in a substrate, the isolation trenches would separating active areas (col. 2, line 37-41; fig. 2); forming an oxide insulation layer outwardly from the substrate, the insulation layer filling the trenches and covering the active areas and substantially conforming to the substrate surface contour (col. 2, line 43-59; fig. 3); forming a spin-on-glass or planarization layer outwardly from the insulating layer and having a substantially flat surface (col. 2, line 64-col. 3, line 10; fig. 4); removing the planarization and the insulation layer by a process that removes both layers at substantially the same rate (col. 3, line 15-20).

Referring to claim 2, the planarization and insulation layer are removed by etching through the layers together down to a CMP depth outward from the active area and CMP the CMP depth to a polish stop layer above the active areas (col. 3, line 15-25).

Referring to claim 13, the method further comprises forming devices in the active areas to form an integrated circuit on the substrate (col. 3, line 41-53).

Referring to claims 3, 5, 14 and 15, the etching rate difference between the two layers is 1:1 (col. 3, line 17).

Referring to claims 6-8, 17, the process further removing the polishing stop, SiN, following the removal of the planarization and insulation layer, thereby forming active areas separated by isolation trench structures (col. 3, line 25-28).

3. Claims 1, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Dixit et al. (US 5,244,827).

Dixit describes a method for forming shallow trench isolation structures comprising: forming a plurality of isolation trenches in a substrate, the isolation trenches would separating active areas (col. 2, line 35-43); forming an oxide insulation layer outwardly from the substrate, the insulation layer filling the trenches and covering the active areas and substantially conforming to the substrate surface contour (col. 3, line 18-23); forming a spin-on-glass or planarization layer outwardly from the insulating layer and having a substantially flat surface (col. 3, line 23-27); removing the planarization and the insulation layer by a process that removes both layers at substantially the same rate (col. 3, line 25-30).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 11, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng as applied to claims 2 and 13 above.

Referring to claims 11 and 20, Zheng doesn't describe the CMP depth is between 1,000-1,500 angstrom above the polishing stop. However, he shows a thickness of 2000-3000 angstrom. It would have been obvious to one skill in the art that the thickness left above the polishing stop layer would have to be determined through routine experimentation in order to provide optimum thickness on the polishing stop with a reasonable expectation of success.

6. Claims 4, 10, 16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng as applied to claims 1, 3, 13 above, and further in view of Tsai (US 6,114,220).

Unlike claimed invention, Zheng doesn't describe the planarization layer comprises a resist material. However, using a resist material as a planarization layer is well known to one skill in the art in the making of the same shallow trench isolation as shown here by Tsai. He describes that a photoresist or spin-on glass layer is used to provide a planarized surfaced on the insulation layer (col. 3, line 40-52). The planarization and the insulation layer are etched by wet or dry etch (claimed resist plasma etch) with the same etching rate (col. 4, line 5-11). Therefore, at the time of the invention, using either layer is equivalent and would be obvious to provide a planarized surface with a reasonable expectation of success.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 6-8 recites the limitation "the polishing stop". There is insufficient antecedent basis for this limitation in the claim.

Response to Arguments

9. Applicant's arguments filed 5/10/04 have been fully considered but they are not persuasive.

Referring to applicant's argument that the HDP oxide formed by Zheng is not substantially conforming to the substrate contour because it is thick over the wide areas and thin over the narrow areas and is 45 degree at the corners is found unpersuasive because the claim doesn't say anything about the thickness nor the angles at the corner other than substantially conforming to the surface. Figure 3 clearly shows that the layer 18 follows the contour of the substrate where it raises and lowers according to the contour of the surface. Therefore, it would read on claimed substantially conforming to the surface.

Referring to applicant's argument that a layer that is uniformly spread over an uneven surface does not form a layer surface that is substantially flat is found unpersuasive because there is no evidence to show so. In contrast, figure 4 shows the layer 20 is substantially flat as it fills up the unevenness of the substrate surface.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 571-272-1462.

DVD

6/23/04

A handwritten signature in black ink, appearing to be 'gd' or similar, located below the date.